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## THE CULTIVATION OF MEDICINAL PLANTS.<sup>1</sup>

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Among the things that have come to us through the European conflict has been an increased interest in the study of geography, and incidentally an increased attention as to the source of the plants which supply our *materia medica*.

In this country and abroad, we have been inclined to regard the supply of certain drugs as inexhaustible, because they are indigenous. As manufacturers, we placed our orders, and tons were piled up in our storehouses. Suddenly we found that a war embargo means a blockade of the drug supply, and our attention is rapidly turned to the home source.

"America can produce anything made or grown on the face of the earth, and produce it better and cheaper than any other nation under the sun," cries the buncombe orator, and the dictum goes forth: "We shall grow our own plants." But while we find that a discussion over a "scrap of paper" can bottle up the world's supply of drugs, we likewise learn that drug plants will not grow on paper. Were this the case the numerous dissertations which have appeared upon this theme would overstock the market.

For more than a generation the decreasing supply of medicinal plants, in our land and abroad, has been discussed from every angle—the field has been well furrowed.

In the appendix to this paper some of the literature which has appeared in the last decade or two is noted. Out of it one can plainly read the injunction "I told you so," as well as find many instructive dissertations. While the work accomplished through these theses has given but little light that can be grasped by the buyer and the

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user of drugs, much of it is of great value in increasing our knowledge of the drug plants which have been studied.

The interest in the cultivation of medicinal plants has been capitalized by the "get-rich-quick" schemes which have used the magazines and public press to exploit extraordinary claims of imaginary profits. "Millions from weeds!" "Plants which grow like weeds, are cut and cured like hay and sell for \$900.00 per ton!" have been used as slogans. These flamboyant frauds, coupled with irresponsible statements that have appeared in the public journals, have been detrimental rather than helpful.

The United States Department of Agriculture has, for some time, given attention to the cultivation of medicinal plants. Its work has included the domestication and cultivation of native drug plants, supplies of which are obtainable with increasing difficulty (*hydrastis*, *senega*, *spigelia*).

The department has also given attention to the crude drugs obtained chiefly or exclusively from foreign sources, which it deemed could be grown profitably in this country. Under its direction, experimental cultivations of *belladonna*, *hydrastis*, *stramonium*, *aconite*, *opium poppy*, and *licorice* have been made in localities exhibiting a variety of climatic and soil conditions.

The fundamental work of the department is, of course, agricultural. The ever-present question is—will it pay the farmer to grow drug plants? The efforts of the department have been limited, but painstaking, and are helpful in so far as they go. But the drug market will not be influenced by its labors until it can convince itself and the agricultural interests that the cultivation of drugs can be made profitable.

But little in the way of encouragement as to the profitable growing of drugs has appeared in the department's publications. However, a recent statement by W. W. Stockburger, of the Bureau of Plant Industry, is to the effect that: "given the necessary favorable conditions a fair return may be expected from several drug crops."

The resources of the Bureau of Plant Industry, at Washington, are available for the dissemination of information, and for the assistance of any institution or person interested in the subject.

Only a few of the colleges of pharmacy have been able to give any serious attention to this important subject. A limited number of schools have established small gardens for research purposes, but at most the scope of such gardens can only be to supply specimens

of drug plants for the classroom. Little or no attention can be given to any one species, nor can any investigations with economic ends be made. The "botanic gardens," so-called, are not likely to solve the problem; their work on the present basis is to grow and study specimen plants.

Without some special stimulus we can look for but little help from the agricultural colleges and farms. The problem confronting these investigators is to improve present agricultural methods, in order to make the farming more profitable. What is needed is the establishment of industrial gardens especially designed for the growth of medicinal plants. This would necessitate several acres of ground in which cultivations of a variety of plants can be made, in a small way at first, extending as the work develops to cultivations under conditions looking towards commercial products. In a measure we need the methods of the agricultural farm adapted to medicinal plants. For information we may turn to the avenues from which our supplies have been obtained in the past.

At present there are a number of successful growers of strictly medicinal plants on the British Islands. Familiar names are those of Ransome & Son, Hitchin; Squire & Son, and Stafford, Allen & Son, Bedfordshire, England. In many instances the work of cultivation is connected with the manufacture of medicinal extracts from the plant. It is to be noted that some of these growers carefully prepare the leaves of digitalis, hyoscyamus, belladonna, etc., and sell them at high prices to American buyers. The portion of the plants which the American rejects, they make into extracts and other compounds for home consumption.

In England, as well as on the continent, the industry of drug growing and drug gathering is being crowded more and more from old centres into regions where labor is cheap. Wild plants are gathered by a lower stratum of peasants, and the tendency to secure cheap labor and keep prices down militates against any improvement in quality. Even before the present upheaval in these countries, the available supply of many crude drugs was not on the increase. Regions where drugs were once gathered are now occupied either by villages and factories, or cultivated farms. Drug plants were exterminated and the gatherers moved on. The main producer, the peasant gatherer, is an ignorant person who knows little and whose desires are small. He has only one market and is satisfied to take whatever price is offered him. As an exception to this, however,

we find that certain intelligent English and continental producers carry on the industry in a painstaking manner. It is also to be noted that in certain cities on the continent sewage farms have been established, on some of which medicinal plant growing has been undertaken.

Under the conditions which obtain in England and upon the continent, the primary object seems to be to maintain a certain color; in other words, the standard is appearance rather than quality. The shrewd producer of drugs has learned that at certain stages of growth, the root and the leaf yield the desired color and texture, and this is the point which he strives to attain.

Some enlightenment as to the condition and quality of the drugs which we manufacture may be gathered from the following observations:

Many drugs, especially roots, when received by the buyer from the growing district, are not marketable. They may not have been well washed and they may not have been well dried, and when looked at in heaps present a motley array of colors, sizes and shapes. It is the province of the dealer to put them into a marketable condition, and this he is able to do by a series of washings, splitting, cutting and drying, and a general dressing up, until the whole lot is brought to a uniform outward appearance. In such an establishment, when one sees a heap of light-colored root which ought to be dark, and a heap of dark-colored root which ought to be light, and in proximity thereto an array of mixtures and solutions of various dyes and the like, he can imagine how easily a change of color might be brought about. In other words, he can realize that many of our drugs are subjected to a toning process which may or may not affect their value for medicinal purposes.

At the present time, at best, and irrespective of the present disturbed condition of the source of supply, we seem dependent upon a haphazard source for our crude drugs. Under this condition the commercial value, the physiological action and the therapeutic value of a given drug may depend quite largely upon the man who removes it from the soil. This suggests to us that the man with the hoe or the man with the scythe is quite as important as the man behind the percolator, for each, in a measure, holds the life of the patient in his hands.

The present source of drug plants seems to stand as a bar to progress. The raw material, the foundation of our work, collected from the most irresponsible and uncontrolled sources, subjected to



every variation of wind and cloud, shifted and changed by every ebb and flow of population and people—the product of the labor of the outcasts from human life, constituting the meanest of industries, and one in which any change in the status of the people sends the drug gatherer further and further into the abyss. The living medicinal plant, containing the most delicate and sensitive substances in *materia medica*, is handled by rough, coarse, destructive methods—mixed, sophisticated, adulterated by unscrupulous middlemen. The organic structure of the highest complexity, and containing the most delicate principles known to science, is handled more roughly than ore from the mines, or lumber from the forests.

Pharmaceutical chemistry and manufacturing pharmacy have made much progress in our day, and when we look into the source of its basic material we wonder that it has made this progress. To compare the history of belladonna, or any drug plant, from the field to the laboratory, with that of textile fibre and dyewoods, is a thousand degrees to the disadvantage of the manufacturing pharmacist. It seems to me that to place the supply of medicinal plants on an equal basis with oats, rye, wheat, or fruits, and apply to them the knowledge of modern horticultural and agricultural science, is to place them on a safe and rational basis, which will amount to a revolution in medicine.

In the case of plants that have a large demand, certain scientific attention has been given to their source of supply, and where such attention has been given, as in the case of drugs which produce the essential oils, and such plants as cinchona, vanilla, etc., the value of the product obtained, as compared with haphazard methods, has been strikingly demonstrated. The drugs to which pharmacists and manufacturers alike have given no attention along this line would, when taken collectively, also involve a large money value.

Is it not true that any drug which is of sufficient importance to be engrafted into the *Pharmacopœia*, or to be used as a life-saving agent, is worthy of our best attention? Would not the extension of the study which has been so beneficial to a few of our drugs serve for the benefit of all our medicinal plants?

Practically all of the medicinal substances which dose the American people, and residents in foreign lands, are either made, or in one way or another supplied by this Association of Manufacturers of Medicinal Products. The problem of the future supply of medicines from plants rests with us. How shall we meet it? In the past we

have relied upon the law of supply and demand. We have not hesitated to ravish the earth to fill the drug warehouses, and when the drug granary was overflowing we lowered the price to choke off the inflow.

For the moment the acres in Europe where drugs grow have been furrowed with trenches of the contending armies, and the soil has been enriched by the bodies of the slain. This latter statement is literally true in respect to portions of Belgium, France and some of the Polish provinces. So far as the continental drug supplies are concerned, we can await the faltering slow recovery in the aftermath of the war, we can trust to favoring or unfavorable winds—we can let it alone.

Manufacturers of medicine have never given serious attention to the cultivation of native drugs. For fifty years the husbanding of the supply, and cultivation, have been urged, with little avail. We shall find scarcely any relief from the farming industry. Drug plants are such a specialized crop in comparison with food products, and so limited in demand, that we may at once forestall any hope that the farmer will ever supply us with little else than packing straw.

The suggestion made by the writer, that every pharmacist might cultivate drugs in his home garden, has been criticised. Continental druggists, by this method, as well as augmenting their supply by purchasing from their neighbors, fill their home demand and at times accumulate a surplus for the market. Were the thousands of American pharmacists to raise a few pounds of drugs, the effect would be apparent, and if these pharmacists would apply their training in science to this work, we could hope for some enlightenment upon the drugs which we use. I do not hesitate to recommend to every member of this association to prepare now and put in his back yard a few drug plants such as he uses in his laboratory. He will possibly receive some pleasure and not a little edification from his effort.

The situation seems to be that for drug plants there are no vast regions where millions of pounds of plants are produced industrially. There are less than a score of places in the world where they are cultivated, and from these places but little reaches our market. For the most part our drugs come from the lower peasant people, including the "mountain whites" of our own land. By handfuls they accumulate at some central point, and then by a circuitous route reach the laboratory. There can never be a certainty or a uniformity of supply—there can never be an improved supply. The advance of

industry into a region changes and stifles even these meager sources. At the present time our whole drug supply of the south and middle west is threatened by the advent of the settlement worker, who proposes to civilize the mountain people—teach them to give up digging and dance the tango. Thus do the “war lords” and the missionary uproot the drug supply.

It does not seem right that we should rest content to obtain the basic material for our industries from such haphazard sources. Under these conditions we are not on a par with the maker of steel or the hammerer of brass and copper. They can separate the elementary product which they need—we cannot change a root or leaf. We are not on an equal footing with the old-time herbalist, who went into the field and selected from the living plants—we take it as it is sent to us. The records of work upon the properties of plants, their constituents, their action and uses fill volumes, but of the growing plant itself we know less than did the ancient herb doctor.

To view the question rightly we must approach it from a different point of the circle. There must be a great change. If, for example, the supplies of drug plants from any source actually and permanently ceased, manufacturers would then begin to till the fields, and in a decade our supply in quantity and quality would differ radically from that which obtains at present.

No catastrophe is great enough to close and keep the American factories closed if they were really put to it. The factor of price would not govern, and here is the crucial test. If we want an improved supply of medicinal plants we can get them. If we want to control the quality of the raw material that enters into our laboratory, we can do it. We can make our extractions from selected leaves and roots and flowers if we will, but this will mean no little outlay. It will require a change greater than all the world's wars, greater than an earthquake, pestilence or famine can bring about. It means a change in the spirit that guides and rules our business life. Sufficient home-grown medicinal plants to supply our needs will come only when we eliminate the factor of cost, when we approach the problem in the spirit of service, and for the time eliminate the spirit of gain. Belladonna grown by Johnson & Johnson cost in the first years one hundred dollars per pound; digitalis grown in the Lilly gardens cost probably one thousand dollars for the first few pounds, but it has been worth the effort and the world has been enriched from the outlay.

There are certain possibilities, as well as probabilities, connected

with the cultivation of medicinal plants that are worthy of consideration by the manufacturers of products therefrom.

First, the manufacturer who starts out with high expectations, and places a hundred or a thousand acres of ground under cultivation, without consideration of all the factors connected therewith, will be surprised at the small yield and the corresponding high cost of his product. If, without due consideration, he should induce the farmers and gardeners in the vicinity of his factory to put medicinal plants under cultivation, he would also be surprised and disappointed at the outcome.

If all the manufacturers who are interested in belladonna should succeed in the cultivation of a considerable number of acres, the yield might be so large as to depress the price and discourage further attempts, and the whole matter would swing back to former conditions. If, at the close of the European struggle, certain supplies of crude drugs should come forward, and the amount, quality and price become satisfactory, the manufacturer would be apt to rest content and leave things as they are.

On the other hand, there are possibilities which should invite the attention of the conscientious manufacturer.

First, the possibility of an increased yield. Thus the drugs now in scant supply and low in quality might become constant.

In the cultivation of medicinal plants there is the possibility of securing uniformity, which is not possible under the conditions which now prevail. It is a well-known fact that plants such as cinchona, opium and the like, under cultivation have given an increased yield of constituents, and there is good reason to believe that other medicinal plants might be made to follow the same course.

It has been demonstrated that in certain plants, under cultivation, there is an increased, possibly an enhanced action. Incidentally, it has been established that by destroying the diastase immediately upon gathering certain plants, it is possible to retain the appearance of the fresh plant unimpaired, especially as it relates to color value. A notable example of this came under the writer's observation on the drug farms abroad. With such plants as belladonna, hyoscyamus, etc., the leaves are collected in such a way that they are not allowed to wilt, and are carefully dried and sold at a high price per pound. The same part of the plant, carelessly handled, would bring only a few cents per pound. The power of the drug obtained from plants in which the diastasic ferments have been destroyed has been found

in general to be more active than those dried in the ordinary manner, and there are recorded results showing a different action from specimens prepared by different methods.

Plants in life contain soluble ferments, and during the ordinary process of drying these ferments exert an oxidizing and hydrolyzing action upon the constituents; they change in color, odor, taste and appearance, and it has been hinted that the action of these ferments resulted in the loss of a large proportion of the active principles.

The problems quite tersely set forth by the Department of Agriculture, and others, as arising in connection with the medicinal plant cultivation are as follows:

Some of the lines of study and investigation which need to be emphasized are those surrounding the adaptation and acclimatization of medicinal plants;

The conditions under which the active principles of the plants are formed;

The behavior of the plant itself under varying conditions of climate and culture.

One authority, Dr. F. A. Miller, gives the following specific enumeration of the problem:

What species are best?

What type of soil is the most suitable for the individual plant?

What fertilizer, if any, should be used?

How much cultivation and irrigation is necessary?

Which are the best months for harvesting, curing and packing?

Particularly desirable is a practical basis and correlation of the study of varieties of the plant constituents, due in part to the difference in geographical locations.

Finally, the statement is made that the selection and breeding of medicinal plants not only promises to merit a reward of great practical and economical importance, but also affords a field for the widest scientific activity.

As a tangible suggestion towards this end, I offer the following:

Manufacturers of the class represented in this association may turn over to their laboratory staff the work of investigation of one or more plants.

Several manufacturers, notably Eli Lilly & Co., the H. K. Mulford Company, and Johnson & Johnson, have in a way independently contributed much towards this end.

Manufacturers can encourage the work by the establishment of



gardens devoted to medicinal plants, connected either with colleges of pharmacy or agricultural colleges, in which investigations and research can be made with industrial ends in view. This would necessitate either individual donations to such institutions, or the establishment of a joint fund to be applied to the purpose noted.

Finally, we may assume that if the manufacturers of medicinal products are really interested in securing a plant drug supply, improved in quality and quantity, they can do so if they are willing to pay the price; that is to say, they must pay the price of years of systematic, scientific investigation and experimental cultivations, which under the present conditions are necessary to bring about a successful outcome.

#### WORK OF THE COLLEGES OF PHARMACY.

From reports received it would seem that only a few of the colleges of pharmacy were giving attention to the cultivation of medicinal plants. A very large number of them do not possess even a garden, or other facilities for the growing of medicinal plants, instructions being given from herbarium specimens. In other instances, however, there are gardens connected with the colleges where medicinal plants are grown in a small way for study and for the preparation of herbarium specimens. This work has no bearing upon the cultivation of medicinal plants in a commercial way.

List of colleges of pharmacy reporting no gardens or other facilities for the cultivation of medicinal plants:

The Temple University, Philadelphia, Pa.

Howard University School of Medicine, Washington, D. C.

University of Alabama, Mobile, Ala.

Vanderbilt University, Nashville, Tenn.

Cleveland School of Pharmacy, Cleveland, Ohio.

Medical College of Virginia, Richmond, Va.

Columbia University, College of Pharmacy, New York.

University of Iowa, Iowa City, Iowa.

Brooklyn College of Pharmacy, Brooklyn, N. Y.

University of Maine, Orono, Maine.

Massachusetts College of Pharmacy, Boston, Mass.

University of Kansas, Lawrence, Kan.

University of Buffalo, Buffalo, N. Y.

Northwestern University School of Pharmacy, Chicago, Ill.

North Dakota Agricultural College, Agricultural College, N. D.

- \* New Orleans College of Pharmacy, New Orleans, La.
- University of Tennessee, Memphis, Tenn.
- Ohio State University, Columbus, Ohio.
- Medico-Chirurgical College of Pharmacy, Philadelphia, Pa.
- College of Pharmacy, Los Angeles, Cal.
- University of Colorado, Boulder, Colo.
- North Pacific College, Portland, Ore.
- University of Illinois, Chicago, Ill.
- Tulane University of Louisiana, New Orleans, La.
- South Dakota State College, Brookings, S. D.
- College of Pharmacy, Ohio Northern Pharmacy, Ada, Ohio.
- Pittsburgh College of Pharmacy, Pittsburgh, Pa.
- Colleges of pharmacy which have a garden of medicinal plants for student work:

- California College of Pharmacy, San Francisco, Cal.
- Purdue University, Lafayette, Ind.
- Philadelphia College of Pharmacy, Philadelphia, Pa.
- Fordham University, College of Pharmacy, Fordham, N. Y.
- University of Oklahoma, Norman, Okla.

Colleges of pharmacy which are doing practical work in the cultivation of medicinal plants:

- University of Minnesota, Minneapolis, Minn.—

At this institution a number of medicinal plants are propagated from the seed each year, both for the study of the plant by the student, and practical demonstration work in the drying, curing, preservation and preparation of the plants for the market, together with a comparison of the cultivated plant with the same drug as found on the market.

- University of Wisconsin, Madison, Wis.—

In this institution the work of their medicinal herb garden is carried beyond being a mere adjunct to the course in pharmacognosy. It is practically a northern station for the cultivation of medicinal plants, working in coöperation with the Department of Agriculture at Washington. Its main object is to ascertain what medicinal plants can be cultivated advantageously in regions having a climate similar to that of Wisconsin. The work is done by members of the university staff, in conjunction with a government expert. Their reports state that their activities are not confined to the material raised in their medicinal herb garden, but have extended to breeding experiments of such drugs as *Datura*, of which fifteen or twenty species and varieties

have been under more or less extensive cultivation in conjunction with the Agricultural Experiment Station.

University of Michigan, Ann Arbor, Mich.—

The work of this institution is in part the cultivation of plants for student work. They have recently acquired eighty-five acres of land, and intend to give attention to the cultivation of a larger variety of plants upon a more extended scale.

University of Nebraska, Lincoln, Neb.—

This institution has established a medicinal garden in connection with the School of Pharmacy, which they are just developing upon a large scale. They hope to give attention especially to several important drugs which are native of Nebraska.

University of Washington, Seattle, Wash., College of Pharmacy Department, have recently extended their medicinal garden with a view of enabling students not only to study as many as possible of the ordinary drug plants under cultivation, but to enable the college to furnish information as to what drug plants may be profitably cultivated on a commercial scale in the region of the State of Washington.

From the foregoing list it will be seen that there is a sharp line of demarcation between the small or teaching garden and the industrial garden, where the ultimate object in view is a commercial one.

Dr. W. W. Stockburger, physiologist in charge of the Drug and Poisonous Plant Investigations, has emphasized this point. He states that the cultivation of medicinal plants should, at best, be considered as a special enterprise, requiring not only considerable knowledge and skill, but a general grounding in the fundamental uses of the plants themselves.

Dr. Stockburger also states that there are a few cases where manufacturing chemists have, themselves, undertaken to get their own requirements of certain plants, and in his opinion these are favorable conditions under which to secure an authentic and better supply of drugs of standard quality than those afforded by the commercial drug garden operated by the manufacturers themselves.

He further states that the primary interest of the farmer who undertakes the cultivation of medicinal plants is the profit which he can make out of them, and the most helpful thing that manufacturers can do towards promoting the cultivation of medicinal plants in this country is to recognize the quality of the products by a corresponding advance in price. At the present time the greatest uncertainty prevailing in the minds of many who have considered the cultivation

of these plants is that, prior to the present disturbance of trade, many of the drugs were imported and sold at prices so low that it would be impossible to compete with them in this country. Unless the agriculturist can be assured of a margin of profit at least equalling that which he can obtain from other crops, he cannot be expected to give serious attention to the growing of medicinal plants.

Dr. Stockburger holds strongly to the consideration of the desirability of manufacturers interesting themselves directly in the production of medicinal plants, and of the necessity of recognizing, in a substantial way, the efforts which may be made in the production, under cultivation, of drugs of a high quality.

#### THE WORK OF MANUFACTURERS.

A number of manufacturers in recent years have given considerable attention to the problem of the cultivation of medicinal plants. As reported to the writer these manufacturers include Eli Lilly & Company, of Indianapolis, Ind.; H. K. Mulford & Company, of Philadelphia, Pa., and Johnson & Johnson, of New Brunswick, N. J.

Eli Lilly & Company—

The work of Eli Lilly & Company has been most painstaking and interesting. In the year 1914 they attempted the commercial cultivation of stramonium and American cannabis: These were the outcome of some years of experiment in the way of selection and breeding, and in an effort to increase the quality of the resulting product. They state the results have shown that it will be possible, through the use of modern breeding methods, to increase both the quantity and the quality of these drug plants, but unless this plan is followed the success of any plant growing in this country seems to be doubtful. One of the problems that must be overcome is the high cost of labor necessary in handling crops of a special nature. They believe, however, that the improvement in the quality of the drugs would tend to offset the increased cost of labor.

In respect to stramonium—they have found that it responds very readily to different soil conditions, and that on certain types of soil it would be impossible to grow the plant with profit. They believe that this same condition exists with numerous other medicinal plants.

They state that they do not feel they are ready to make positive recommendations for the growing of medicinal plants unless one is prepared to carry on considerable experimental work, and is prepared

to meet the loss incurred in such culture as labor, greenhouses, sheds, etc.

The laboratory of Eli Lilly & Company has issued a number of very interesting reprints dealing with their work upon various drug plants.

H. K. Mulford & Company—

In connection with their scientific department, H. K. Mulford & Company maintain a small drug farm at Glenolden, Pa., devoted more particularly to the experimental cultivation of *digitalis*, *belladonna*, *hyoscyamus*, *Cannabis sativa*, and *Hydrastis canadensis*.

In a paper by John A. Borneman, published in the AMERICAN JOURNAL OF PHARMACY, 1912, page 546, the cultivations are described in detail, together with directions and suggestions in regard to the selection of soil, time of planting, collecting, drying, etc. The writer states it has been proved that cultivated plants yield as large, and more often a larger, amount of alkaloids or glucosides than the same species of the wild plant, and there should be no reason why the cultivation of medicinal plants should not make more rapid strides in this country.

In reference to *digitalis*—he states that the first-year plants yield a higher percentage of glucosides than is required by the Pharmacopœia, and if the first-year plants would be admitted to the Pharmacopœia it would pay to cultivate the drug, as the yield for the first year is about three times that of the second year.

In reporting on the crop for the year 1914, this company states: "With the kind of soil that we have available, which is very rich, and the kind of fertilizer, of which we have plenty, and the kind of care that we were able to give the plants, the crop was a successful one.

"Some of our crop was from field-grown seeds, and the balance from hot-house plants. Either method can be made successful, but the field-grown seeds must be planted at a time when the moisture in the soil is sufficient, and we should say, ought to be quite a little more than that required by farm crops.

"The cost per acre for planting, weeding, cultivating and finally harvesting, drying, stripping the leaves, etc., makes the crop very much more expensive than any other farm crop that we know of, but our figures show that the crop as we raised it gave a fair margin of profit. Last year we did not raise any other drug but *cannabis*; this year we expect to extend the line to at least *digitalis* and *belladonna*.



"We have some digitalis plants growing now in the hot-house from seeds just as an experiment, to give us some experience with the plants. We also have belladonna seeds planted under similar conditions, but up to this time we have no seeds germinated. With this one we anticipate considerable difficulty."

In reference to *Hyoscyamus niger*, Mr. Borneman states that he has found it difficult of cultivation, owing to its destruction by insects. He does not think it will pay to raise these plants unless it is possible to bring the assay up to the standard and obtain a good price for the drug.

In respect to *Hydrastis canadensis*, it is stated that the cultivation is very simple, and he believes it would pay to cultivate this drug, owing to the enhanced price. It is his opinion that a plant raised in the woodland makes a slower growth, and does not make nearly as good an assay as that raised by artificial shade.

Johnson and Johnson—

In a small and large way Johnson & Johnson have been interested in the cultivation of belladonna since 1899, and their work has been more or less continuous. The experiments for the first few years were confined to planting in rows, and in various classes of soil, with a view of studying the effect of various fertilizers, in connection with which assays were made from the plants at various stages of growth, as well as horticultural experiments, with a view of producing larger sized plants. These experiments were extended at one time to a fifteen-acre plot.

The reports of their work have been published from time to time, an important part of which has been to the effect that they never succeeded, in the climate of New Brunswick, in securing plants direct from the planting of seeds in the ground. Their work included examination of the various modes of curing and preservation, as well as physical and chemical observations in connection with their laboratory.

In all of their work it was found that the tops were destroyed by the fall frost, and the entire plant killed in severe winters. A fairly rich ground with plenty of lime gave the best results, although the size of the plants might be increased by the use of various fertilizers.

Under the direction of Johnson & Johnson experimental plantings were made in many parts of the United States, they furnishing the seeds or plants for this purpose. A cultivation was made in Con-

shohocken, Pennsylvania, embracing a few acres of very good limestone soil, and in this section and in this soil they attained most remarkable results as to the size and yield of the plant.

Through an arrangement with Prof. Albert Schneider, of San Francisco, Cal., very extended cultivations of belladonna were made in that state, beginning with small plantings in a garden of medicinal plants, finally extending to a plot of upwards of forty acres in Castro Valley, Alameda County, California.

A report of these California cultivations has been issued in the *Proceedings of the American Pharmaceutical Association*, 1909, page 833.

The results in California were interesting, but unsuccessful from various causes, including climatic conditions, abnormal seasons and lack of experience.

Prof. Schneider's summary of belladonna culture in the United States is to the effect that belladonna can be grown successfully in many states of the Union, and that two crops can be gathered in one season; that the alkaloidal yield apparently runs high in cultivated belladonna; that the plant can be grown more profitably in the warmer states than in the colder regions.

The writer understands that Prof. Schneider has continued his work on belladonna during recent years, but the results have not been published.

On the whole Johnson & Johnson have had an experience of fifteen years in the cultivation of belladonna in all parts of the United States, and while this experience has contributed very largely to the knowledge of the plant itself, and has directed attention to the cultivation of this particular plant, as well as others, the results may be summarized by stating that it has been very expensive, and from a commercial point of view has been far from successful. But the fact has been established that belladonna can be cultivated in the United States, and the firm will continue their work upon this plant from year to year.

#### DRUG PLANTS WHICH MAY BE CULTIVATED IN THE UNITED STATES.

The Department of Agriculture gives the following as a partial list of plants now chiefly produced in Europe which, under certain conditions, may be grown in the United States:

Althæa, Anise, Belladonna, Burdock, Calamus, Caraway, Conium, Coriander, Dandelion, Digitalis, Elecampane, Fennel, Henbane, Horehound, Marjoram, Sage, Thyme, Valerian.

SEEDS.

The following list of seedsmen and nurserymen in whose catalogues medicinal plants and seeds are listed was compiled by Dr. Fred A. Miller, of Indianapolis, Indiana :

<i>Name of Firm.</i>	<i>Location.</i>
Bash's Seed Store .....	Indianapolis, Ind.
P. J. Berckmans Co. ....	Augusta, Ga.
A. T. Boddington .....	New York City
Bobbink & Atkins .....	Rutherford, N. Y.
Ernst Benary .....	Erfurt, Germany
Biltmore Nursery .....	Biltmore, N. C.
W. Atlee Burpee & Co. ....	Philadelphia, Pa.
California Nursery Co. ....	Niles, Cal.
John L. Childs .....	Floral Park, N. Y.
Henry A. Dreer .....	Philadelphia, Pa.
Elliott Nursery .....	Pittsburgh, Pa.
D. M. Ferry & Co. ....	Detroit, Mich.
Fottler, Fiske, Rawson Co. ....	Boston, Mass.
Edward Gillett .....	Southwick, Mass.
Glen St. Mary Nurseries .....	Glen St. Mary, Fla.
Gregory & Son .....	Marblehead, Mass.
Isaac House & Son .....	Bristol, England
Peter Henderson & Son .....	New York City
Horsford's Nurseries .....	Charlotte, Va.
Haage & Schmidt .....	Erfurt, Germany
Kelway & Son .....	Langport, England
Medical Nursery .....	Calcutta, India
Livingston Seed Co. ....	Columbus, Ohio
C. C. Morse & Co. ....	San Francisco, Cal.
T. V. Munson & Son .....	Denison, Tex.
Monroe Nursery Co. ....	Monroe, Mich.
Henry Mette .....	Quedlinburg, Germany
Oregon Nursery .....	Salem, Ore.
Roumanille Lafayette Pere & Fils. ....	St. Remy de Provence, France
John A. Salzer Seed Co. ....	La Crosse, Wis.
J. M. Thornburn & Co. ....	New York City
Vaughan's Seed Store .....	Chicago, Ill.
Watkins & Simpson .....	London, England
J. D. Webster .....	Chichester, England
Yokohama Nursery Co. ....	Yokohama, Japan

(To be Continued)

THE PHARMACY AND MATERIA MEDICA OF THE  
BRITISH PHARMACOPŒIA OF 1914.<sup>1</sup>

By GEORGE M. BERINGER.

The appearance of a revised pharmacopœia of one of the leading nations is an event of general pharmaceutical interest. The importance of such a revision from an American viewpoint is greatly enhanced if the pharmacopœia revised is that of a nation whose consanguinity, language, and practices are so closely allied to our own as are those of the British Isles. Hence the appearance of a new British Pharmacopœia during the past year becomes one of the most important pharmaceutical events.

It is apparent that any attempt to review the pharmacy and materia medica of the Fifth Edition of the British Pharmacopœia within the time allotted for a paper presented to a pharmaceutical meeting, must necessarily be cursory and incomplete. Moreover, one is too prone to consider the volume from the viewpoint of American practice, without realizing what has been the aim of the Medical Council and which, in the following statement in the preface, they claim to have accomplished: "Has now been able to produce a British Pharmacopœia suitable for the whole Empire." This statement indicates to what extent that ideal of the British Government, the solidarity of all of the people of the numerous divisions of the British Empire, has progressed. The present edition displaces not only the edition of 1898, but also the Indian and Colonial Addenda of 1900. The dismissal in the revision of so many of the drugs used exclusively, or nearly so, in the Oriental British possessions indicates the advancement of the movement for uniformity of medical standards and practice throughout the British Empire.

In this revision the Medical Council departed somewhat from the methods of the previous revisions and sought the coöperation of pharmaceutical, chemical, and botanical authorities by instituting conferences and committees on reference, and thus aimed to obtain information, advice, and investigation from many experts outside of the Council.

In this revision the metric system of weights and measures is

<sup>1</sup> Presented at the meeting of the New Jersey Pharmaceutical Association. Spring Lake, N. J., June 15-18, 1915.

used throughout, even for the statement of doses, "in the expectation that in the near future the system will be generally adopted by British prescribers." "At the present time students and practitioners of medicine are accustomed to use the metric system in connection with the work of chemical, physical, physiological, pathological, and pharmacological laboratories; it will doubtless facilitate the application of science to practice when the same system is used for therapeutic purposes also." We sincerely trust that in this respect the British practitioners of medicine, veterinary medicine, and pharmacy are more ready to adopt this innovation than have been their American brethren in these professions. The term "cubic centimetre" is displaced by "millilitre," and in the statement of doses in the metric system this is abbreviated to "mil." and the fractional portions are "decimil." and "centimil."

In the preface it is recommended that prescribers cease to employ the long-used symbols for drachm and ounce, as they are apt to be misread, and are used at times to convey different meanings. The symbol  $\bar{\text{z}}$ , for example, "is to represent sometimes 480 grains, sometimes 437.5 grains, and also to represent 1 fluidounce."

The preface likewise defines what is meant by a percentage solution; "thus a solution of '1 in 10' or '10 per cent.' means that one gramme of a solid or one millilitre of a liquid is contained in ten millilitres of the solution." This statement is not strictly accurate, nor is it in accord with the exact meaning of the word percentage.

In considering synonymy, only the most important of the synonyms employed in prescribing have been inserted. Abbreviations of the Latin titles have been adopted and published as a table in the Appendix. In this the revisers were undoubtedly influenced by a foreknowledge of the intent of the U. S. P. IX in this direction.

The acceptance of the principles of "The International Agreement" promulgated by the International Congress for the Unification of the Formulæ for Potent Drugs and Preparations, held at Brussels in 1902, has necessitated some changes in this edition of the British Pharmacopœia. The practice of Great Britain as well as America has been to measure liquids by volume and solids by weight, and this has been maintained instead of following the custom of continental practice, and endorsed by that agreement, of weighing liquids as well as solids.

The substances admitted are not numerous and are covered in a list of 43 titles. Cantharidin replaces cantharis and mylabris, and



is used in all of the galenicals in which these drugs were formerly directed, on the basis of the average content of 0.5 per cent. of cantharidin in cantharides, which quite likely is the average yield of the pure active principle. This change has necessitated a change in titles of preparations to acetum cantharidini, emplastrum cantharidini, tinctura cantharidini, and unguentum cantharidini.

Diluted hydriodic acid is admitted for the purpose of making the syrup, which is likewise on the list of admissions.

Cassia fructus, cassia fistula pod, is admitted for the purpose of giving a formula for "Cassia pulpa," which should more correctly be entitled an extract.

Senna fructus, the senna pod, is another new title. Senna pods are official in several of the European pharmacopœias, and their use is extending likewise in the United States.

Under the title of "Ipomea radix" the Orizaba jalap root is admitted, with the synonym of Mexican scammony root. This has been done to permit its use as a substitute for the true scammony root for the preparation of scammony resin.

Scammony resin is defined "as a mixture of resins obtained from scammony root or from Orizaba jalap root." This is an unfortunate exhibition of legalizing a specious fraud that has been extensively carried on in the substitution of the chemically different resin of ipomea for that of scammony. The requirement of "not less than 75 per cent. soluble in ether" shows how deliberate the purpose.

Cresol is one of the additions and as a new preparation liquor cresol saponatus made with castor oil and potassa soap. This is a good preparation with which we are not unfamiliar.

Formaldehyde is admitted, and liquor formaldehydi saponatus is a soft soap (from olive oil and potassium hydroxide), hydro-alcoholic solution of formaldehyde, and should prove a useful addition to the antiseptics.

Among ointments and ointment bases we note that a formula for benzoinated prepared suet has been introduced, and it is recommended that in India this should be employed instead of benzoinated lard in the making of ointments. Unguentum lanæ compositum, a mixture of prepared lard 40, wool fat 40, paraffin ointment 20, is a recruit with the synonym of emollient ointment. A veteran in American practice, Goulard's cerate, with a modified formula with camphor omitted, is admitted under the title of unguentum plumbi subacetatis.

The list of deletions is a formidable one of 168 titles. A number

of these are Oriental drugs that probably have gone out of use because of the change of medical practice in the colonies. There are, however, in this category a number of titles of old friends, such as camboge, cimicifuga, coca leaves, conium fruit and leaves, crocus, elaterium, humulus, jaborandi, lupulin, mezereum, musk, pareira, physostigma, sarsaparilla, and sumbul.

Among the preparations dismissed, we note a number of decoctions and infusions and the concentrated liquors introduced in the edition of 1898 for the purpose of permitting of the extemporaneous preparation of decoctions and infusions. It would seem that the "Liquores concentrati" met with little favor, and, further, that English practice is gradually being weaned away from the copious draughts of infusions and decoctions of drugs.

Our British brethren have shown some further appreciation of the advantages of powdered extracts and have adopted the powdered form for a few additional extracts, notably the extracts of belladonna, hyoscyamus, nux vomica, and opium. The diluent directed in the extracts of belladonna and hyoscyamus is the powdered respective drug of determined alkaloidal content. In the extracts of nux vomica and opium, calcium phosphate is directed as the diluent, and in the extract of strophanthus, milk sugar. The degree of fineness of the powder specified under extract of belladonna is a No. 20 sieve. This certainly will yield a rather coarse powder. The menstruum directed for extract of belladonna and hyoscyamus is 70 per cent. alcohol. A stronger alcoholic menstruum is necessary to obtain a powdered extract of proper strength and permanent fineness of powder. Where formulas are given for both the liquid and the dry extracts of the same drug, the word "Siccum" is added to the title of the latter. It would seem to have been preferable to have uniformly used this term in the titles of all such dry extracts.

In the Latin titles 38 changes have been made. Most of these are of a minor character and for the purpose of more exactly defining the official articles or preparations. Aloe now covers both aloe barbadensis and aloe socotrinæ of the previous edition, and senna folia includes the former senna Alexandrina and senna Indica. Kino eucalypti replaces the less appropriate eucalypti gummi, and oleum Chaulmoogræ replaces oleum Gynocardia. Among preparations, we note that tinctura iodi fortis replaces liquor iodi fortis, and tinctura iodi mitis replaces tinctura iodi. The stronger contains 10 Gm. of iodine and 6 Gm. of potassium iodide in 100 millilitres and

corresponds closely to the tincture of iodine of the international agreement. The tincture of iodine of the British Pharmacopœia of 1898 contained only 2.5 Gm. each of iodine and potassium iodide per 100 millilitres; hence this is now to be known as the "weak."

Important changes in the strength of 41 preparations have been made. The reason for many of these is apparent; for some, however, the reason is not evident. The endeavor to harmonize the potent galenicals with the standards of the international agreement accounts for the changes in syrup of ferrous iodide, a number of the tinctures, and in mercury ointment.

Syrup of ferrous iodide contains 5 per cent. of ferrous iodide and 10 per cent. of glucose as a preservative.

Tincture of aconite is about twice as strong as that of the Pharmacopœia of 1898, and is directed to be made with 70 per cent. alcohol and then assayed and standardized so that 100 mls. contain 0.04 Gm. of the ether-soluble alkaloids. This formula agrees in the menstruum with that directed by the Brussels protocol, but starts with 150 Gm. of aconite, yielding doubtless a good preparation, and it would be difficult to establish that it is "approximately the same strength as the tincture of aconite of the international agreement."

Tincture of belladonna is to be made by percolating 100 Gm. of the powdered leaf with 70 per cent. alcohol, and in addition is standardized to contain 0.035 Gm. of the alkaloids in 100 millilitres.

Tinctures of colchicum and digitalis likewise agree closely with the requirements of the protocol.

Tincture of nux vomica is to be made from the liquid extract by diluting, and is standardized so that 100 millilitres contain 0.125 Gm. of strychnine.

Tincture of opium is made from the gum opium and standardized so that 100 millilitres contain 1 Gm. of anhydrous morphine. The product will correspond to the international agreement in alkaloidal (not alcoholic) content, and will be about one-third stronger than the laudanum of the previous edition.

In tincture of strophanthus we have a straddle. In attempting to comply with the requirement of the protocol, 100 Gm. of ground seeds and 70 per cent. alcohol are directed, but the de-fatting of the drug with ether is prescribed. The footnote states that "this tincture is made with four times the proportion of seeds ordered by the previous pharmacopœia, and it is approximately the same strength as the tincture of the international agreement." This formula is, how-

ever, subject to several criticisms. It is entirely proper to de-fat the drug before making the tincture, but the de-fatting should be with purified petroleum benzin and not with ether, because the latter extracts a portion of the strophanthin. The percolation with ether should not be "until the liquid passes through colorless," but should be continued until a few drops evaporated from filter paper leave no greasy stain. Alcohol of 90 or 95 per cent. will not entirely extract strophanthus in the proportion directed, and much less will alcohol of 70 per cent. serve this purpose. A more serious error is the direction to discontinue the percolation with the alcohol when 500 millilitres are obtained and then to add sufficient 70 per cent. alcohol to obtain 1 litre. Under these conditions the drug will probably be not more than one-half extracted.

The diluted acids, with the exceptions of diluted acetic acid (5 per cent.  $\text{HC}_2\text{H}_3\text{O}_2$ ) and diluted hydrocyanic acid (2 per cent.  $\text{HCN}$ ), are now uniformly 10 per cent. of the respective absolute acids, instead of the odd proportions of the 1898 Pharmacopœia, which had diluted hydrochloric acid, 10.58 per cent.  $\text{HCl}$ ; diluted nitric acid, 17.44 per cent.  $\text{HNO}_3$ ; diluted phosphoric acid, 13.8 per cent.  $\text{H}_3\text{PO}_4$ , and diluted sulphuric acid, 13.65 per cent.  $\text{H}_2\text{SO}_4$ .

In the text the aromatic waters are directed to be made by distilling the water, in some cases with the drug and in other cases with the volatile oil. In Chapter XII of the Appendix, under "Alternative Preparations Sanctioned for Use in Tropical, Sub-tropical, and Other Parts of the British Empire," it is stated: "Aquæ olei anethi, anisi, carui, cinnamomi, fœniculi, menthæ piperitæ, mentha viridis. Each of these waters may be prepared by triturating the corresponding oil with twice its weight of calcium phosphate and five hundred times its volume of distilled water and filtering the mixture. In tropical and sub-tropical parts of the Empire these aquæ olei may be used in place of the corresponding aquæ of the text of the Pharmacopœia."

It is exceedingly doubtful if this territorial restriction will be observed by the practical pharmacists of Great Britain, once they become as fully acquainted as are their American brethren with the easy and practical method of preparing saturated aqueous solutions of these aromatic oils by the use of an insoluble distributing medium. It will be difficult to convince the practical pharmacist that such waters as peppermint and spearmint must be prepared by distilling the oil and water instead of a simple process of solution, or that these waters

of the British Pharmacopœia are superior because of such exposure to heat.

The unsatisfactory and tedious process for extract of ergot of the 1898 Pharmacopœia is replaced by a process in which the ergot is extracted by water, the aqueous extract concentrated, and alcohol added; after standing, the liquid is filtered off and evaporated to proper consistence.

*Extractum filicis liquidum* is made with ether and corresponds to our oleoresin of male fern. Description, tests, and assay process for filicin are introduced, and the product is standardized as containing 20 per cent. of filicin.

*Extractum glycyrrhizæ* is to be made by macerating liquorice root with chloroform water, expressing and heating the expressed liquid to 100°, then straining and evaporating. The liquid extract is made by a similar process, the alcohol being finally added only as a preservative.

*Extractum hydrastis liquidum* is to be prepared with 60 per cent. alcohol (instead of 45 per cent. in 1898) and to be standardized to contain 2 Gm. of hydrastine in 100 mls. of the product.

*Extractum ipecacuanhæ liquidum* is to be prepared by extracting with 90 per cent. alcohol without the treatment with lime as directed in the Pharmacopœia of 1898, and is to be standardized so that 100 mls. shall contain 3 Gm. of alkaloid.

*Extractum nucis vomicæ liquidum* is to be prepared with 70 per cent. alcohol, the fat removed by treatment with melted hard paraffin, and the product standardized to contain 1.5 Gm. strychnine in 100 mls. No attempt is made to recover the alkaloid removed by the paraffin de-fatting.

Four formulas are given for hypodermic injections. While there may be good reason to endorse a standard formula for a hypodermic injection of ergot, there is a better reason that would require that this be directed to be dispensed in sterilized and sealed ampoules. In this day of universally-used, well-prepared, and stable hypodermic tablets it seems unnecessary to include in a modern pharmacopœia formulas for hypodermic injections of morphine, strychnine, etc.

*Liquor ethyl nitrite* is retained as the title for a preparation containing from 2.5 to 3 per cent. of ethyl nitrite in a mixture of 95 volumes of absolute alcohol and 5 volumes of glycerine. There is also official the *spiritus ætheris nitrosi*, containing 1.52 to 2.66



per cent. by weight of ethyl nitrite in alcoholic solution. The need for both is not understood.

The volatile oils are well defined and generally the necessary tests for identity and quality are clearly given. The assay processes are the simplest that can be satisfactorily applied. Instead of an elaborate process for determining the amount of cineol, the oils of cajuput and eucalyptus are assayed by the phosphoric acid method, and for pharmacopœial purposes this is probably all that is necessary. In oil of lemon the citral is determined by the hydroxylamine method.

For at least several decades the trend of pharmaceutical authorities has been toward a clearer differentiation of the classes of galenicals; toward defining within proper lines each class of preparations and the grouping of the individual formulas, wherever possible, under such defined classes. It was to be expected that in this revision these proper classifications would be respected and followed. Yet we find oleoresin of male fern "an oily extract," entitled "Extractum filicis liquidum," and printed along with the extracts, despite the statement in the preface that "most of the liquid extracts are of such a strength that one hundred millilitres represent one hundred grammes of the drug employed." An acacia emulsion of castor oil is classed with the mistura and printed with such formulas as chalk mixture and compound mixture of iron.

The treatment of the botanical drugs is disappointing. There is lacking that thoroughness of description that one would expect in a modern pharmacopœia prepared by those who have every opportunity to be acquainted with the progress of science and the great advances in pharmacognostic knowledge since the appearance of the previous edition, sixteen years ago.

The names of the authors of the binomials adopted are given, but in no case is the family or other botanical classification given. The references to the works where the medicinal plants are figured, a feature of the pharmacopœia of 1898, are omitted, and there is good reason to consider that such information is out of place in a pharmacopœia.

In some cases the definition of the drug assumes the style of a rubric and states the alkaloidal standard; in other cases, with equally important drugs, this is omitted, as occurs, for example, in the definitions of belladonna root, hydrastis, and hyoscyamus.

Any one who has occasion to examine crude drugs knows that they are very rarely free from admixtures. Sometimes these ad-

mixtures are other portions of the plant yielding the drug, and at other times they are unavoidable or accidental foreign substances. No attempt whatever is made to either recognize the presence of such admixtures or to fix limitations therefor.

The descriptions of the macroscopical characters of the drugs are very little improvement over those of the former edition. It is rather the exception that the descriptions of the histology or microscopical structural characteristics of the drugs or of the powders are given with any degree of thoroughness, and the common adulterants and their characteristics are not even mentioned.

While in some drugs a limit of ash has been added, in many others equally important this has been ignored. As examples, the ash of lobelia has been fixed in this revision at "not more than 12 per cent.," but for hyoscyamus no limit of ash is given.

The tenacity with which the English people adhere to the tenets and practices of their fathers and forefathers, their aversity to innovations and the making of radical changes, is a recognized trait of the English character. This conservatism of the nation is reflected in their pharmacopœia, and, while we criticise in a friendly spirit some of its defects and lack of progress, we recognize that it is a safe and practical book of standards for most of the substances prescribed in British medical practice.

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## THE CHEMISTRY OF THE BRITISH PHARMACOPŒIA, 1914.<sup>1</sup>

By CHARLES H. LAWALL.

In reviewing the chemical text of the British Pharmacopœia, 1914, one would naturally be prepared for some radical changes, inasmuch as the last edition of the book bears the date 1898, which is sixteen years previous.

Undoubtedly the most radical change (and this applies to the book in a broad sense) is in the adoption of the metric system, together with the use of the word "millilitre," which is given throughout the text in the unabbreviated form. That this change is radical will be appreciated by all who know the history of the Imperial

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<sup>1</sup> Read at the annual meeting of the New Jersey Pharmaceutical Association, June, 1915.

System, but that the change was made easier by the present cordial relations existing between England and France is also doubtless true.

Another radical change is that the atomic weight table is changed from  $H = 1$  to  $O = 16$  to conform with other recently-revised pharmacopœias and general chemical practice.

As in the previous edition, most of the qualitative tests and quantitative methods are given in full in the Appendix, and are merely referred to in the text when necessity occurs. It is in connection with volumetric determinations that the following prefatory note is found, which gives an idea of the character of the knowledge and skill required of a pharmacist in the British Empire: "Details of procedure in these and other chemical operations are now left to the skill and judgment of pharmacists and of analysts who are assumed to be fully trained."

In looking over the prefatory lists of additions and deletions one is struck by the fact that of the 42 substances which have been added to the official list (a very small number, considering that 168 were deleted), 29 are chemicals, and of these 22, or more than half the total, belong to the class of organic chemicals and most of them are synthetics. The detailed consideration of the chemical substances which have been added or changed is as follows:

*Acetone*.—This substance, which was first made official in the U. S. P. VIII in our own country, is now recognized and described. It is used as a solvent in making liquor epispasticus, or blistering liquid, formerly made with acetic ether.

*Acetylsalicylic Acid*.—This is described under the title "Acidum Acetylsalicylicum," no mention being made of aspirin. The English patent laws make such independent recognition possible, which cannot be done in the United States, owing to the product patent.

*Diluted Hydriodic Acid* of 10 per cent. strength (same as the U. S. P.) is recognized now and is permitted to contain 1 per cent. of hypophosphorus acid for preservative purposes.

*Picric Acid* is now recognized, accompanied by the somewhat unfamiliar (to us) synonym "carbazotic acid." The rubric requires it to be of 99 per cent. purity.

*Adrenalin*, defined as "lævomethylamino-ethanol-catechol," is described as being obtained from the suprarenal glands of animals (species and varieties not specified), and is an ingredient in liquor adrenalinii hydrochloricus, made by dissolving 0.1 per cent. adrenalin, with the aid of diluted hydrochloric acid, in recently-boiled distilled

water made isotonic with sodium chloride and preserved by saturation with chloroform.

*Alum* has had its official title changed from alumen to alumen purificatum, but for what reason is not clear, as the requirements for purity remain the same as in the previous edition.

Under the Latin title *Barbitonum* is described diethyl-barbituric acid, with the synonyms "Malonurea" and "Diethyl-malonyl-urea." No mention is made of the proprietary title "Veronal."

*Benzaminæ Lactas*, or benzamine lactate, is the unfamiliar name for beta eucaine. It is defined as the lactate of benzoyl-vinyl-diaceton-alkamine," a rather unusual designation for trimethyl-benzoxypiperidine, which is ordinarily given as the chemical name for beta eucaine.

The title *Benzol* has been changed to *Benzenum*. There is no danger of confusion with petroleum benzin, which is recognized only in the Appendix under the unmistakable name of petroleum spirit, with petroleum ether as a synonym.

The title *Borax* has been changed to borax purificatus. The reason is no more apparent than for the similar change referred to under alum, for the requirements are practically identical in both books.

*Calcium Lactate* is officially recognized for the first time with a rubric of 93 per cent. of a salt containing 5 molecules of water of crystallization.

*Cantharidin*,  $C_{10}H_{12}O_4$ , is also recognized for the first time. It is described as being obtained from various species of cantharis or of mylabris, and the melting-point is given as  $210^{\circ}$  to  $212^{\circ}$  C.

The title of *Carbonis Bisulphidum* has been changed to "Carbon disulphidum," the requirements remaining essentially unchanged.

*Chloral Formamidum* is the official name of chloralamide, recognized for the first time.

*Cresol* is recognized for the first time and is described as "a mixture of the isomers of the formula  $C_7H_7OH$ ." It is used in preparing liquor cresol saponatus, also a new addition, which consists of 50 per cent. weight in volume of cresol in a castor oil-potash soap.

*Diamorphinæ Hydrochloridum* is the rather unusual name selected for the hydrochloride of heroin or diacetylmorphine.

*Ethyl Chloride* is described for the first time, and in order that it may be advantageously made from methylated spirit it is permitted to contain "a small but variable proportion of methyl chloride,"

although in the assay method it is required to show a saponification figure "corresponding to not less than 99.5 per cent. by weight of esters calculated as ethyl chloride."

*Ferri et Potassii Tartras* is the newly-adopted name for the article formerly official as *ferrum tartaratum*. It is assayed by incinerating to ferric oxide, of which the yield should be not less than 30 per cent. by weight.

*Ferri Phosphas Saccharatus* is the title of a new preparation defined as "ferrous phosphate more or less oxidized, mixed with glucose and containing not less than 60 per cent. of ferrous salts, calculated as  $F_3(PO_4)_2 \cdot 8H_2O$ ." It is described as "a slate-blue, amorphous powder, taste sweetish and chalybeate."

*Glucosum*, used in the foregoing preparation and also in syrup of ferrous iodide, to retard oxidation, and in a syrup of glucose, is defined as "a mixture of dextrose and other analogous substances obtained by the hydrolysis of starch." It is permitted to contain about 0.1 per cent. of sulphur dioxide, an amount far in excess of that found in American glucose at the present time.

*Guaiacol* and *Guaiacol Carbonate* are both described for the first time, and products of either natural or synthetic origin are permitted.

*Hexamina* is the title of hexamethylenetetramine, which is required to be of 98 per cent. purity, a method of assay being given.

The title of *Hydrargyri Oleas* is changed to *Hydrargyrum Oleatum*, and instead of being made by double decomposition and precipitation of hard soap solution with solution of mercuric chloride, as was formerly the case, it is now made by direct combination between yellow mercuric oxide and oleic acid. The product is now not so much a chemical compound as a pharmaceutical preparation, which probably accounts for the change in the title.

*Liquor Formaldehydi* is now official and is required to be of from 38 per cent. to 40 per cent. strength, weight in volume. It is used in preparing *liquor formaldehydi saponatus*, which contains 20 per cent. by volume of solution of formaldehyde in a solution containing 40 per cent. by weight of soft soap and 30 per cent. of 90 per cent. alcohol. The official soft soap of the British Pharmacopœia is an olive oil-potash soap.

*Methyl Salicylate* is now recognized and is required to contain 98 per cent. of  $CH_3C_7H_5O_2$ . Oil of gaultheria is also recognized under its own title, and is defined as "the oil distilled from the leaves of *Gaultheria procumbens* or from the bark of *Betula lenta*."



*Methyl Sulphonol* is the newly-coined name for trional (diethylsulphone-methyl-ethyl-methane), but why it is called methyl sulphonol, when it differs from that substance by an extra ethyl group, is a mystery.

*Pelleterine Tannate* is simply defined as "a mixture of the tannates of the alkaloids obtained from the bark of the root and stem of *Punica granatum*," without attempting to specify the alkaloids by name, as is done in the U. S. P. VIII.

*Phenolphthalein*, of course, has recognition, owing to the phenomenal increase in its use in medicine during recent years.

*Resorcin*, strange to say, although recognized in most other pharmacopœias for several decades, is officially described for the first time.

The title of *Sodii Arsenas* has been corrected to *Sodii Arsenas Anhydrosus*, and is required to contain not less than 98 per cent. of anhydrous sodium arsenate.

*Sodii et Potassii Tartras* is now the official title of the former soda tartarata, and is required to be of 98 per cent. purity.

In *Sodii Phosphas Acidus*, or acid sodium phosphate, we have probably the first official recognition that has ever been accorded to sodium dihydrogen phosphate,  $\text{NaH}_2\text{PO}_4$ , sometimes known as sodium biphosphate. It is required to contain not less than 70 per cent. of the anhydrous salt, and is assayed by titration with standard alkali.

*Strontium Bromide* is recognized for the first time, although other pharmacopœias have long included it among the official substances. It is required to contain not less than 97 per cent. of  $\text{SrBr}_2 \cdot 6\text{H}_2\text{O}$ .

*Theobromine and Sodium Salicylate* is another substance recognized in Great Britain for the first time, although previously given official recognition in continental Europe.

*Zinc Oleostearate* is the official title of the product made by double decomposition and precipitation between a solution of zinc sulphate and a solution of a mixture of hard soap and curd soap. It is described as a "nearly inodorous, yellowish-white, or grayish-white powder," and corresponds closely to our own official zinc stearate, misnamed because usually made in the same manner. The curd soap and hard soap of the above formula are respectively animal fat and vegetable fat soaps with soda.

Taking the chemistry of the British Pharmacopœia as a whole, while it shows some progress since the previous edition of 1898, the advance has not been as marked as will be shown in the U. S. P. IX over the U. S. P. VIII.

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## THE PHARMACY OF USEFUL DRUGS.<sup>1</sup>

By M. I. WILBERT, Washington, D. C.

Soon after the organization of the Council on Pharmacy and Chemistry of the American Medical Association, in the early spring of 1905, it became evident that much of the then existing misuse of proprietary remedies was due to the fact that by far the greater number of medical practitioners had received but inadequate instruction regarding the possible uses and limitations of official and other widely-used medicines. It was also recognized that, with the limited amount of time that could be devoted to materia medica subjects in the already overcrowded curriculum of medical schools, it would be practically impossible to present even a superficial view of the four or five thousand drugs and preparations in everyday use.

As the fundamental object of the Council on Pharmacy and Chemistry is to develop and to foster the intelligent, scientific use of medicinal preparations in the treatment of disease, it became necessary to consider the practicability of bringing about a change in the then existing condition. At the meeting of the American Medical Association in Boston, in 1907, the problems involved were discussed, and, on the recommendation of the Section on Pharmacology and Therapeutics, a sub-committee of the Council was appointed to consider ways and means to bring about more efficient instruction in materia medica subjects. This sub-committee, after due consideration, came to the conclusion that teachers in materia medica subjects in medical schools felt that it was necessary to impart a smattering of information in regard to a large number of drugs and their preparations because members of state medical examining and licensing boards were likely to ask questions regarding them. Members of state medical examining and licensing boards, on the other hand, thought it desirable to ask questions regarding the many thousands of

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<sup>1</sup> Presented at the meeting of the Pennsylvania Pharmaceutical Association, Forest Park, Pa., June 22-24, 1915.

official and non-official drugs and preparations because teachers of materia medica subjects referred to them in their lectures and discussed them in their text-books. From this conclusion it became evident that if the members of state medical examining and licensing boards could be induced to restrict their examinations in materia medica subjects to a more limited list of articles more time could be devoted to their study. Conversely, if instruction in materia medica subjects could be restricted to the comprehensive consideration of a reasonably limited number of widely-used and thoroughly well-established articles the student could be given a thorough grounding in the properties and uses of the several drugs and preparations, and this would go far toward eliminating many, if not all, of the then existing abuses.

The acceptance of such a list of useful drugs, it was further thought, might serve as an added incentive for the development of international standards of purity and strength of widely-used medicaments.

The original list was compiled in coöperation with the Council on Medical Education of the American Medical Association, and was subsequently submitted to members of the National Confederation of State Medical Examining and Licensing Boards. It was later submitted to teachers of materia medica and therapeutics in medical schools and to members of state medical examining and licensing boards, and, finally, through the columns of the *Journal of the American Medical Association*, to medical practitioners generally.

The principles guiding the inclusion of articles in the list of useful drugs were primarily based on the continued extensive use of a drug or preparation, on the reports of clinical experiments as reflected in current literature, and on the reports of experimental work done in pharmacologic laboratories and in hospitals equipped with proper laboratory facilities.

Recognizing the influence of current medical literature, even when evidently of an advertising nature, the Council has included in the list of useful drugs a number of articles not now included in the Pharmacopœia of the United States or to be included in the revision now in press.

In round numbers the present list of useful drugs includes 450 titles, of which 231 may be classed as drugs and chemicals, 173 as preparations, 43 as definitions of forms of drugs, and 13 as cross references.

As suggested above, the list is primarily intended to be educational and to reflect as nearly as is practicable the best medical practices of the time. The object is not to restrict teaching in medical schools to this list, but to make sure that medical students are given a comprehensive and satisfactory training regarding the properties and uses of the several articles and are duly impressed with their shortcomings and limitations.

It is satisfactory to note, in this connection, that teachers in medical schools generally have evidenced an appreciation of the need for devoting an additional amount of time to the consideration of the more important medicaments, and there is now a fair prospect that future graduates in medicine will be given ample instruction to develop an efficient therapeutic armamentarium.

The pharmacy of this list of useful drugs has as yet not received the care and attention that is properly due it. Pharmacists generally do not appear to realize that much, if not all, of the dissatisfaction with established or well-known drugs is due to the fact that as these drugs reach the patient they are frequently not strictly in accord with the requirements of established standards.

The compilation of data from the reports of state boards of health and of state food and drug inspectors, as presented in the several volumes of the "Digest of Comments on the Pharmacopœia of the United States and on the National Formulary," clearly shows that fully 50 per cent. of the more widely-used preparations do not comply within reasonable limits with official requirements. The chemist of the Maine Agricultural Experiment Station, in a recent comment on this shortcoming, says, in part:

"It is rather startling to find that half of the pharmaceutical preparations examined, which are as simple to make as a batch of biscuit, differ more than 10 per cent. from the standard."

The object of pharmacy is to exercise control over the identity and purity of articles used as medicine, and, while it is generally admitted that the average pharmacist cannot well be expected to systematically examine all of the thousands of articles carried in stock, there is practically no reason why he should not concentrate his efforts and ability on the limited number of articles included in the list of useful drugs so as to assure physicians and others that the articles included in this list will uniformly comply with the official requirements.

As noted above, the list is intended to include only such drugs and preparations as are in general use or are accepted as having well-established medicinal value or demonstrated superiority. The list at the present time includes practically all of the preparations of the Pharmacopœia of the United States for which standards and assay processes are included, and also includes practically all of the widely-used household remedies that are frequently examined and reported on by officials entrusted with the enforcement of food and drug laws, and for these reasons alone pharmacists would do well to consider the practicability of devoting additional attention to the systematic examination and control of the several articles.

With the impending revision of the Pharmacopœia and of the National Formulary, the Council is about to revise the list, and teachers in medical schools, members of state medical examining and licensing boards, and others are being consulted at the present time in regard to the practicability or desirability of omitting from and adding to the list of useful drugs.

In this connection it should be remembered that the members of the Council fully realize that, individually or as a body, they are neither omniscient nor infallible. From its very origin the Council has courted the coöperation and assistance of not alone medical men, but also of pharmacists.

In the revision of the list under discussion it is particularly important that pharmacists should be given an opportunity to record their criticisms and opinions of the list and its objects and to suggest ways and means for inducing pharmacists generally to prepare and to dispense the preparations included in the list in accord with official requirements.

As has been pointed out before, we, in this country, are sadly in need of more energetic and more effective control of all drugs and medicines. The only really safe and efficient control involves honesty, knowledge, intelligence, and care on the part of the person dispensing the medicine to the consumer, so that, unless pharmacists as a class can be induced to devote special attention to the systematic examination and control of drugs and preparations widely used in the treatment of disease, the manufacturers of specialties or proprietaries will continue to have a reasonable argument with which to approach the physician. In conclusion it may be stated that pharmacists as a class may well endeavor to secure for themselves and for their craft the recognition and respect that is properly their due for services ren-



dered, but it will be practically impossible to do this unless they collectively and individually insist that all members of their craft live up fully to the requirements that may be reasonably made of them.

Twenty-fifth and E Streets, N. W.,  
June 16, 1915.

## A DEVICE FOR THE RAPID SALE OF NIPPLES.<sup>1</sup>

By GEORGE M. BERINGER, JR., P.D.

"Mister, will you please give me a nipple, right-away. I'm in a hurry. The baby's outside in the go-cart and I'm afraid he will fall out." You rush to the place where you keep your stock; hand out a nipple; are told "that is not the kind"; try another with equal success; then pull one from each box in stock, till you have a handful from which the customer can select. Before you have finished waiting on her another customer demands your attention, and, without time to reassort them, you dump the handful of nipples into the first convenient box. Maybe it wasn't you, but your clerk, who "messed up" the nipple stock. However, the next time you wanted to sell one you had to hunt all through that "junk pile" to find the particular kind demanded.

Here is a device that may help you to prevent such occurrences. It will require from one-half to three-quarters of an hour to make it, and you will need very few tools.

Take a smooth piece of wood of convenient length—about one-half inch thick and six inches or more wide. Sand-paper this perfectly smooth and mark off points one and one-half inches apart each way to the same number as you have styles of nipples. Attach three-fourths-inch, or any convenient size, wooden button moulds, which you can obtain at any store dealing in dressmaking goods, at each point, by means of small brass screws, and over each peg thus formed, a nipple is stretched. For larger nipples, like Hygeia, use the tops of turned wood boxes of convenient size, with a hole drilled through the middle. For smaller sizes, like the Maw style, use large, round-headed brass screws. The nipples can be arranged on the stock shelves in the same order as on the display board described. If so

<sup>1</sup> Presented at the meeting of the New Jersey Pharmaceutical Association, Spring Lake, N. J., June 15-18, 1915.

desired, a small label can be put on the board in front of each nipple, giving the name of that particular style or its number, so that one can be picked from the proper box without disarranging the rest of the stock. The nipples should not be sold directly from the display board, but should be changed at frequent intervals, so as to keep them in good condition.

### PENNSYLVANIA PHARMACEUTICAL ASSOCIATION

With an exceptional record for the year behind it and with an era of exceptional promise before it, the Pennsylvania Pharmaceutical Association, on the evening of June 24, brought to a close the most enjoyable annual meeting in its thirty-eight years of existence. The sessions took place at Forest Park Hotel, Pike County, June 22, 23, and 24.

From the standpoint of action, the convention was equally important. The incoming Legislative Committee was instructed to prepare an Itinerant Venders' Bill. It was decided to carry on regularly a State-wide publicity campaign by having a Committee on Publicity, through the lay press, keep the public informed on all pharmaceutical issues of general interest, particularly of a legislative character.

J. Leyden White, the Washington representative of the N. A. R. D., who was present and made a thrilling address on the Stevens price-maintenance bill, was elected an honorary member, while marked enthusiasm followed the decision of the meeting to re-affiliate with the N. A. R. D.

The Legislative Committee was instructed to forward to President Wilson and to Congress a resolution demanding a repeal or change of our present patent laws so as to allow free competition in the manufacture of preparations now monopolized by foreign manufacturers, and urging the proper encouragement of American manufacturers.

The N. A. R. D. was requested to withdraw from the Chamber of Commerce of the United States because of the belief that the problems of unfair competition, truth in trade, and price standardization will not be fairly handled by that organization and its committees.

The State Pharmaceutical Examining Board was asked to make allowance in the matter of qualifications for the experience gained by

applicants for registration in hospital dispensary work, and was requested to classify hospital dispensaries under the State Pharmacy Law. The preliminary report of the Voluntary Conference for the drafting of modern laws on pharmacy, being conducted by the Section on Education and Legislation of the American Pharmaceutical Association, was endorsed with one exception, so far as the principles involved were concerned. Unqualified endorsement of the Stevens bill was also given.

According to the Committee on Drug Market, the standard of the drugs coming into the American market from abroad this year is equal to that of last year. The Committee on Trade Interests announced that something-for-nothing schemes had been one of the stumbling-blocks in the path to success of the retail drug trade in Pennsylvania during the past year, and that such schemes were largely responsible for the high cost of living.

Professor Joseph P. Remington announced that the Ninth Revision of the United States Pharmacopœia was one-third in print. Statistics showed that the legitimate use of narcotic drugs by physicians in their practice was about the same since the Harrison law became effective, but that the illegitimate use and their use in patent medicines had largely fallen off.

The report of Secretary D. J. Reese showed that 220 new members had been elected during the year and that the association membership is now 1200. The excellent work of the Travelling Men's Auxiliary, which secured 191 of these members, was acknowledged.

Departing from its rule of twenty years' standing, of holding the annual meetings at a summer resort, the convention decided to accept the invitation of the Reading Board of Trade and go to that city, June 20, 21, and 22, 1916.

Officers were elected as follows: President, Theodore Campbell, Philadelphia; first vice-president, Adolph Schmidt, McKeesport; second vice-president, Adam B. Heckerman, Port Royal; secretary, David J. Reese, Philadelphia; assistant secretary, Lewis H. Davis, Philadelphia; treasurer, F. H. Gleim, Lebanon; member of the Executive Committee for three years, Crull Keller, Harrisburg; local secretary, M. W. Bamford, Reading.

The Travelling Men's Auxiliary, whose members provided an excellent entertainment program, selected the following officers: President, A. J. Staudt; vice-president, J. Q. Reinhart; secretary, A. L. Wolcott; treasurer, J. D. McFerren, all of Philadelphia.

## ALBERT PLAUT.

## AN APPRECIATION.

In the death of Mr. Albert Plaut, which occurred on Thursday night, June 17, at the Hotel Ritz-Carlton, New York City, the country's commerce, and particularly the drug business, lost a rare and powerful personality, a good and loyal friend, and a bright and alert intellect.

At an age when one might look for rest and ease from what was practically endless achievement he has fallen a victim to his activities. The anxieties of these activities slowly ate into his vital reserve and removed from the manufacturing and wholesale drug business of America one of its most commanding figures.

Mr. Plaut was born in 1857, in Eschwege, Germany, and came to this country when eleven years old. After attending the public schools, the College of the City of New York, and the New York College of Pharmacy, he entered the drug business with his father in 1872. About five years later he became associated with Lehn & Fink, which was then an infant business, and, after displaying his ability as stock clerk for a time, he was transferred to the general business office, where he acquired the fundamentals on which he was later to build the superstructure of one of the largest drug houses in America. In 1886 he became a partner, succeeding Mr. Lehn. Twelve years later his brother, Joseph Plaut, succeeded the remaining original partner, Mr. Fink.

When, in 1910, the business of Lehn & Fink was incorporated, Albert Plaut was made president, Joseph Plaut treasurer, and William J. Gesell secretary. The present fine structure at 120 William Street was built in 1901, after the destruction by fire of the company's old premises at 128 William Street. The general laboratory and perfumery and pharmaceutical plant and drug mill were constructed in Brooklyn in 1906.

Besides his task as guiding member of the firm of Lehn & Fink, Mr. Plaut generously lent his aid whenever and wherever the interests of the drug business in general demanded it.

As a member of the New York Wholesale Druggists' Association Mr. Plaut was elected its president in Milwaukee in October, 1912, and he presided at the convention the following year in Jacksonville.

At various periods he served as chairman of the Committee on Drug Markets, chairman of the Committee on the Prevention of Adulteration, Fire Insurance and Legislation, and chairman of the Committee on Proprietary Goods. He was twice chairman of the Committee on Suits against Members, and also twice a vice-president of the association.

Mr. Plaut was prominently identified with the founding of the Metropolitan Drug Club and the Druggists' Supply Corporation. He was an active member of the New York Drug and Chemical Club and of the Drug Trade Section of the New York Board of Trade and Transportation, of which he was elected chairman in 1903, and was also a director of the general board for more than fifteen years.

In recent years he was vice-president of the New York College of Pharmacy, having been a trustee of the institution for fifteen years, and at the time of his death was chairman of its Committee on Instruction. He was also a member of the Committee of Revision of the United States Pharmacopœia, being elected at the convention in 1910.

In 1909 President Taft sent him as government delegate and chemical expert to the Seventh International Congress of Applied Chemistry in London, and he was instrumental in obtaining the selection of New York City as the meeting-place for the Eighth Congress of Applied Chemistry, which was held in September, 1912.

To the Princeton Chemical Club Mr. Plaut, early in 1912, presented an endowment fund of \$5000 to obtain lecturers on chemical subjects from other universities.

In April, 1914, he founded the Isaac Plaut Travelling Pharmaceutical Fellowship in the New York College of Pharmacy as a tribute to the memory of his father.

As an indication of the affection and regard in which Mr. Plaut was held by all who had relations of any kind with him, we quote from the funeral eulogy delivered by Mr. Edmond E. Wise:

"I stand here to-day at the bier of my good and loyal friend to pay to him the last tribute of respect. An inscrutable Providence saw fit to remove him in the fulness of his strength, when he was beginning to enjoy thoroughly the fruits of his past achievements, while still ambitious to strive and struggle for greater triumph. Rebellion against fate is futile. He has been taken away, and all that is left to us is to be thankful that we who honored and loved him were privileged to share with him some of the joys of his life, and to lighten some of its burdens. In whatever relation of life that we saw him, he was a



man, shouldering his burdens in a manly way. From his boyhood to the day of his death, his ambitious, restless mind was constantly planning some honorable method to mount the next rung on the ladder of success. As an humble clerk he entered the firm of which he died the head. From a comparatively modest position in the commercial world he raised it to a position of acknowledged eminence, and he himself was recognized as one of the leading merchants of this great community, not only from the financial standpoint, but in every public movement which aimed to improve its business conditions or to protect it from attack. In large measure his success was due to his untiring efforts, his wonderfully keen judgment of men and matters, and, above all, to his indomitable courage, which enabled him calmly and with fortitude to face certain defeat without cramping or paralyzing his will-power or his energy. Never was this quality more conspicuously displayed than in his last, his final struggle. Barely ten days ago, an apparently trivial illness assumed a dangerous aspect. His alert mind promptly recognized that he was standing face to face with the Angel of Death, and that he was entering upon that conflict which is the final destiny of all mankind. He sent for me, and as I stood by his bed of pain he held out his hand in greeting and, in a calm but earnest voice, he exclaimed, '*Moriturus saluto*' ('Dying, I greet you'). He then proceeded with an unclouded and an untroubled mind to discuss various matters in most minute detail. He dwelt with sincere appreciation upon the loyalty of a large group of his old employees to whose efficiency he attributed much of his business success, and finally acknowledged his debt of gratitude to his old employer for the kindness and consideration shown to him at the beginning of his career. How many men under such circumstances would have shown such thoughtfulness and given to others such credit? And yet his ability to appreciate both the good and the evil that resides in every man was one of his characteristics. Though he saw blemishes, he also saw virtues behind them. Though he fully recognized the faults of his friends, he did not therefore altogether condemn them, nor did it diminish his esteem of them.

"Nor was he himself without fault. He was a strong man and he had all the failings of his strength. He delighted in the glitter and glory of public honors; yet he placed honor above all honors. His very strength made him at times appear quick and ruthless, yet none more than he regretted the pain he inflicted, for he was large of heart as well as broad of mind.

"Taking it all in all, his life was a happy one. He enjoyed progressive prosperity, and before age had withered his faculties or dulled his sensibilities he died surrounded by a loving family and mourned by a host of friends. Indeed, he realized the good wishes of the ancient sage who wrote:

"The hour that ushered thee to life, my child,  
Saw thee in tears whilst all around thee smiled;  
Oh, may the hour that summons thee to thy eternal sleep  
See thee in smiles whilst all around thee weep."

The Board of Directors of the Merchants' Association of New York held a special meeting and adopted the following minutes:

"The members of the Board of Directors of The Merchants' Association of New York hereby record their deep sorrow at the death of Mr. Albert Plaut, which occurred on Thursday, June 17, 1915, in this city. .

"Although charged with the cares and responsibilities of a large and successful business, Mr. Plaut never failed to respond generously to every demand made upon him in connection with the welfare of the promotion of the trade of New York. His unfailing energy and zeal have been important factors in developing the capacity for usefulness on the part of The Merchants' Association of New York, and in creating its ability to serve the city. The confidence reposed in him was indicated by the fact that he was elected a director of the association on February 25, 1909, in which capacity he has since served continuously, and by the fact that he was elected successively to each of the three grades of the office of vice-president of this association.

"As our associate on this Board, Mr. Plaut has commanded the respect and affection of its members. Although he possessed a strong personality and was tenacious in his support of what he regarded as right, he was always generous toward the opinions of others; was invariably a friend of progress and improvement, and took a keen interest in all projects for the betterment of conditions both at home and abroad. The wide range of his active, vigorous, and well-informed mind made his counsel of high value.

"Mr. Plaut loved the city in which he lived, rendered his services freely and unselfishly, and represented the best type of worthy citizenship, both in his business career and in the performance of his civic duties.

"To the members of the family we extend our sincere sympathy in their loss."

Mr. William A. Marble made a brief address to the Board in which he said that during his term as president of the association no member had proved more helpful to him than Mr. Plaut, upon whose assistance and judgment he was always able to rely. In expressing his sorrow at Mr. Plaut's death, Mr. Marble applied to him the words of the poet Halleck:

"None knew him but to love him,  
None named him but to praise."

Mr. Plaut possessed a keen intellect and was exceptionally well informed with regard to all efforts for progress, social, political, and commercial, throughout the world. Although one of the city's most active business men, his interests took a wide range and his views and opinions were strongly individual. He was a tireless worker, and with the growth of his business the burden which he carried increased to such an extent that he often complained that it left him so little time for himself.

By his will Mr. Albert Plaut directed that \$25,000 be divided among twenty-seven employees who had been associated with the

firm of Lehn & Fink for twenty years and over, and \$25,000 to be distributed among those who had been in the company's employ for ten years and up to twenty years, of which there are fifty-three. Bequests of \$54,000 were made to charitable societies, hospitals, and educational institutions.

His stockholdings in Lehn & Fink were distributed among his children, but all of his common stock was bequeathed to his son, Edward Plaut, to whom he also gave the company's buildings on William Street and John Street, New York City.

His other real estate holdings were given to his daughters, Amy Plaut Falk and Constance Plaut. Large bequests of cash were given to his children and other members of his family, and \$5000 was left to Frederick William Fink, one of the original partners in the firm of Lehn & Fink, "in recognition of the kindness and consideration shown me in the early days of my employment by him."

The executors of the will are his brother, Joseph Plaut; his son, Edward Plaut, and his son-in-law, Milton J. Falk.

## PHILADELPHIA COLLEGE OF PHARMACY.

### QUARTERLY MEETING.

The quarterly meeting of the Philadelphia College of Pharmacy was held June 28, 1915, at 4 P.M., in the Library, the president, Howard B. French, presiding.

The minutes of the annual meeting held March 29 were read and approved.

The minutes of the Board of Trustees for March, April, and May were read by the registrar, J. S. Beetem, and approved.

Mr. George M. Beringer, for the delegates to the New Jersey Pharmaceutical Association, reported verbally that the meetings were held June 15 to 18, at Hotel Essex, Spring Lake, N. J. The meetings were well attended, numerous papers were read, and the amount of work accomplished was phenomenal. A new charter was provided because of legislation repealing the old charter. A good spirit prevailed, resulting in one of the best meetings ever held.

Dr. A. W. Miller, for the delegates to the Delaware Pharmaceutical Association, reported verbally. The meeting was held at the Hotel Dupont, Wilmington, Del. The association is a small one;

there were about thirty members present. Only one session was held. No scientific papers were offered, but Professor E. Fullerton Cook, of the College, was present and delivered a lecture that was much appreciated. The routine reports of the officers were read and considered. After dinner the entertainment provided was of a pleasing character.

Professor Remington, for the delegates to the Pennsylvania Pharmaceutical Association, reported verbally that legislative matters occupied much of the time of the meeting. A very exhaustive and interesting report of the secretary of the Pennsylvania Pharmaceutical Examining Board, L. L. Walton, was read. Future legislation was discussed. There were not so many papers presented as in former years. The entertainments provided by the Travelling Men's Auxiliary were unique and much enjoyed. The recent alumni supper given at the Hotel Walton in Commencement Week was referred to by many as the best they had ever attended. The recent changes and additions in the courses of lectures at the Philadelphia College of Pharmacy appeared to be fully understood and concurred in. On the whole, the meeting can be considered a very successful one. The association will meet next year at Reading, Pa., thus making a change in the custom for a number of years past of meeting at summer resorts. Theodore Campbell, our fellow-member, was elected president.

Professor Henry Kraemer, for the Committee on Necrology, reported the death of the following members:

Charles G. Dodson, March 16, 1915. Member since 1891.

Charles L. Eberle, October 5, 1914. Member since 1867.

Henry C. Eddy, August 29, 1914. Member since 1869.

William E. Lee, July 20, 1914. Member since 1907.

Edward H. Hance, December 14, 1914. Member since 1857.

William H. Lacey, September 30, 1914. Member since 1886.

George J. Scattergood, July 20, 1914. Member since 1859.

Professor Kraemer also reported the death of Honorary Member Professor Charles E. Bessey and the death of Dr. Jacobus Polak, of Amsterdam.

The President made the following appointments:

Committee on Nominations—Joseph W. England, Warren H. Poley, F. P. Stroup, John K. Thum, and E. Fullerton Cook.

Committee on Necrology—Henry Kraemer, Edwin M. Boring, and C. A. Weidemann.

Delegates to the meeting of the American Pharmaceutical Association to be held at San Francisco, Cal., August 9 to 14—Joseph P. Remington, Joseph W. England, and F. P. Stroup.

Dr. A. W. Miller, for the Committee on Relief of Pharmacists in Belgium and other places, reported that, in response to the circular sent to members of the College, contributions to the amount of one hundred and forty dollars had been received. The contributors are H. V. Army, George M. Beringer, John E. Carter, E. G. Eberle, George B. Evans, Howard B. French, L. Gerhard, John F. Hancock, Henry Kraemer, H. Matusow, Alfred Mellor, A. W. Miller, F. F. Muller, Warren H. Poley, Joseph P. Remington, Frank G. Ryan, L. E. Sayre, R. M. Shoemaker, C. C. Sniteman, H. P. Thorn, and A. H. Weightman. The money has been deposited in the Continental Equitable Trust Company, in the name of Henry Kraemer, Treasurer, War Relief Fund.

Mr. J. S. Beetem, for the Committee on Membership (in the absence of the chairman, Professor LaWall), read the annual report. In the discussion that followed the reading, Professor Kraemer said, in view of the losses in membership by death, some measures should be taken with a view to increasing the membership of the College.

President French, in the name of James Hansell French 2d, presented an old *lignum vitæ* mortar and pestle. The history of it was known for many years—probably as far back as 1740. The thanks of the College were tendered the donor.

Much interest was shown in examining the certificate of W. W. Glentworth as a Fellow of the College of Apothecaries (the early name of the Philadelphia College of Pharmacy), bearing date October 5, 1821. The signatures of the officers were still very distinct. In the discussion that followed, Messrs. Beringer, Cook, French, Kraemer, Miller, and Remington participated. Many interesting items were mentioned in connection with the early history of the College, and regrets were expressed that so little space was available at present for the display and proper care of the many historical records and relics in the possession of the College.

A letter was read from Mr. William Mittelbach acknowledging the receipt of the diploma of Master in Pharmacy.

C. A. WEIDEMANN, M.D.,

*Recording Secretary.*



## ABSTRACTS FROM THE MINUTES OF THE BOARD OF TRUSTEES.

*March 2, 1915.*—Seventeen members were present. The amendment to Section 3, Article 8 of the By-Laws, which was proposed January 5, 1915, was adopted. Edwin M. Boring said he recently came across some interesting letters relative to Edward B. Garrigues, for many years a member of the Collège and a former treasurer. This caused him to think that a picture of Mr. Garrigues would be a suitable memorial to present to the College. Others also spoke of events that occurred years ago in connection with Mr. Garrigues. The photograph was accepted with thanks of the Board.

*March 16, 1915.*—Adjourned meeting. Fifteen members were present. The Committee on Instruction presented two reports governing the course of Instruction; after discussion, participated in by Messrs. Beringer, Boring, Cliffe, Evans, French, Leedom, Poley, and Sadtler, action was deferred.

*April 6, 1915.*—Seventeen members were present. A communication was received from the Secretary of the College announcing the election of officers for the ensuing year and three Trustees for three years (see this JOURNAL, p. 238). George M. Beringer was reelected chairman of the Board; Walter A. Rumsey, vice-chairman, and Jacob S. Beetem, registrar for the ensuing year. Committee on Property reported the building in good condition. The reports of the Committee on Instruction were again considered, and, after remarks by Messrs. Beringer, Cliffe, French, Lemberger, and Mulford, action was deferred until the next meeting.

*May 14, 1915.*—Fourteen members were present. The reports of the Committee on Instruction were considered and further action postponed until an adjourned meeting to be held May 25.

The Standing Committees were then announced as follows: Committee on Property, Howard B. French, chairman; Committee on Library, Samuel P. Sadtler, chairman; Committee on Museum and Herbarium, O. W. Osterlund, chairman; Finance Committee, Howard B. French, chairman; Committee on Supplies, H. K. Mulford, chairman; Committee on Accounts and Audit, C. A. Weidemann, chairman; Committee on Instruction, George M. Beringer, chairman (with the Faculty *ex-officio* members); Committee on Scholarships, Joseph P. Remington, chairman; Committee on Ex-

aminations, W. L. Cliffe, chairman; Committee on Theses, Joseph W. England, chairman; Committee on Discipline, Howard B. French, chairman; Committee on Announcement, Joseph W. England, chairman; Committee on Commencement, W. A. Rumsey, chairman; Committee on Alumni, Joseph W. England, chairman.

The Committee on Instruction submitted the annual reports from the teaching departments of the College for the consideration of the Board.

Department of Pharmacy reports that the extra lectures on pharmaceutical subjects have been of great interest. The Department requests a projecting lantern for use in lectures. The work in this department, as well as in the other departments of the College, requires the use of large quantities of distilled water, and a larger apparatus is a necessity. The committee recommended that a larger apparatus be installed. The matter was referred to the Committee on Property.

Department of Chemistry.—Professor Sadtler has submitted an outline of a plan for the didactic instruction in chemistry, which he would recommend for the second-year course for the Ph.G. degree and for the third year or post-graduate year. In the latter year it is proposed to give a series of thirty or more lectures devoted to manufacturing and industrial chemistry, and fifteen lectures covering food adulteration and examination.

Department of Botany and Pharmacognosy.—Professor Kraemer suggests improvements in desks and illumination when new laboratories become available. He further points out the limitations of the greenhouse and the roof garden as a source of study of the medicinal plants, and the need of the College having a piece of ground where medicinal plants may be grown and more thorough experimental work and study given. He recommends the reappointment of Philip Fackenthall as instructor in pharmacognosy, and Anton Hogstad, Jr., as instructor in botany, and William Alexander Wallace as student assistant in the work of the first year.

Department of Materia Medica.—Professor Lowe reports that the work of the department has not differed from that of recent years. The report of Professor Lowe, as also that of Professor Roddy, refers to the Department of Physical Culture.

Department of Analytical Chemistry.—Professor Frank X. Moerk reports that the changes in the curriculum whereby it is possible to give the first-year class some elementary chemical laboratory

instruction is a distinct improvement, as it gives the students the important fundamentals of qualitative analysis prior to the third year and places them in a position to commence thesis work on chemical subjects prior to the third year.

Department of Bacteriology.—Professor John A. Roddy reports that two special courses were given in the laboratory this year.

Special Lectures.—The Sub-committee on Special Lectures reported the number of lectures given, and the committee is of the opinion that these lectures should be continued for the year 1915-1916.

Committee on Examinations reported that Mr. Robert Truman Beardsley had satisfactorily passed his examination and was recommended to receive the certificate of Proficiency in Chemistry. It was so ordered.

May 25, 1915.—Twenty members were present. Adjourned meeting. As a result of further deliberation, and because of additional information, the Committee on Instruction submitted a report for consideration, as follows:

*First.*—We recommend that there be established a two years' course of instruction leading to the degree of Graduate in Pharmacy (Ph.G.). That the requirements for admission to this course be: (1) a minimum age of seventeen years; (2) each matriculant must have had a preliminary education equivalent at least to one year's instruction in a high school, and a certificate to that effect, to be approved by the Department of Public Instruction of Pennsylvania.

*Second.*—We recommend that a post-graduate course of one year be established leading to the degree of Doctor of Pharmacy (Phar.D.). A student qualifying for this degree must present: (1) a diploma as a graduate in pharmacy from this College or from some approved school of pharmacy; (2) must have had a preliminary education equivalent to at least the completion of a four years' course in a high school, and must present a certificate to that effect issued or approved by the Department of Public Instruction of Pennsylvania.

*Third.*—That the course leading to the degree of Pharmaceutical Chemist (Ph.C.), as now given, be discontinued after those students whom we have matriculated for this course have completed it.

*Fourth.*—That a post-graduate course of two years be established leading to the degree of Bachelor of Science in Chemistry and Pharmacy (B.Sc.), and that this course be especially arranged for the education of analysts and food and drug chemists. A student qualifying for this degree must present: (1) evidence of having completed

two years of study in an approved pharmacy school or its equivalent in scientific education; (2) must have had a preliminary education equivalent at least to the completion of a four years' course in a high school, and must present a certificate to that effect issued or approved by the Department of Public Instruction of Pennsylvania.

*Fifth.*—We recommend that each candidate for the degree of Graduate in Pharmacy (Ph.G.) must have had not less than four years' experience in the drug business, and that the time actually spent in the College in attendance upon lectures and laboratory instruction shall be considered as part of the time required for such drug store experience, but the credit allowance for such college attendance shall not exceed sixteen months. The candidate may be admitted to the final examinations after the expiration of three years and six months of such practical experience.

*Sixth.*—We recommend that the changes proposed by these recommendations be announced at an early date, and that they be inaugurated with the College session of 1915-1916, and that the degrees as proposed be given in course; also that any student who has matriculated prior to 1915 and has been in attendance must complete the instruction in accordance with the conditions of matriculation and the course for which he or she was entered.

*Seventh.*—We recommend that for the ensuing term the instructions to the first- and third-year students be given on Mondays, Wednesdays, and Fridays, and to the second-year students on Tuesdays, Thursdays, and Saturdays, and that the Committee on Roster be requested to prepare the roster in accordance with this understanding.

*Eighth.*—We recommend that the tuition fees shall be \$120 for each term of the Ph.G. course and \$150 per term for the three and four years' courses, and that the payments be made payable one half at the beginning of the first semester and the other half at the beginning of the second semester of each term.

*Ninth.*—We recommend that a fee of \$5 be charged each student per term for laboratory materials and use of instruments, including microscopes.

The report was adopted.

Committee on By-Laws proposed amendments to the By-Laws.